LIS data processing guide

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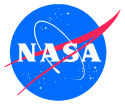
Increasing Interoperability and Performance of
Grand Challenge Applications in the Earth, Space, Life, and Microgravity Sciences

July 5, 2006

Revision 4.2

History:

Revision	Summary of Changes	Date
4.2	Released with LIS version 4.2	July 5, 2006



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Contents

1 Introduction

This document describes how to download, subset, and generate datasets for custom use. Currently the document provides description of the usage of fortran programs supplied with the LIS code to generate data at resolutions coarser than 1km. These programs use the 1km data as the background to generate coarse resolution datasets. Sample 1km datasets can be downloaded from the LIS website.

2 Documentation of LIS data processing programs

The following programs can be obtained from the *data_proc.tar.gz* file.

- vegmask_from_1km.F90
- avgdata_from_1km.F90
- domdata_from_1km.F90
- avgdata_from_1km_STATSGO.F90
- domdata_from_1km_STATSGO.F90

A sample compile script *comp.csh* to compile these programs is also provided.

2.0.1 vegmask_from_1km (Source File: vegmask_from_1km.F90)

This program uses 1km (1/100 deg) landcover data to generate the landcover and landmask data at coarser resolutions for use in the LIS code. Both input and output data are assumed to be in big_endian, direct access formats. 1km landcover data is gridded, whereas at resolutions coarser than 1km, LIS code expects landcover data to be tiled. This program requires the 1km landcover data as input and produces landmask and landcover data at the intended resolution as outputs.

CALLING SEQUENCE:

```
Usage: \\
vegmask_from_1km to-resolution(km) input_file output_file mask_file \\
Usage example: \\
vegmask_from_1km 9 veg_1KM.1gd4r veg_9KM.1gd4r mask_9KM.1gd4r \\
```

REMARKS:

```
 This program works only generating for GLOBAL datasets. \\
This program is currently setup to work with the UMD landcover data,
which has 13 vegetation types. Please change tne number of veg types
to work with other datasets. The undefined points in the output files
will be 0.
```

REVISION HISTORY:

```
Jun 2005 : Yudong Tian, Initial Specification
Jul 2006 : Sujay Kumar, Packaged for public release.
```

2.0.2 avgdata_from_1km (Source File: avgdata_from_1km.F90)

This program uses 1km (1/100 deg) data to generate data at coarser resolutions for use in the LIS code, by performing and aggregated average of the valid grid points. Both input and output data are assumed to be in big_endian, direct access formats and gridded and of floating point type. This program requires the 1km dataset to be aggregated, and the landmask at the coarser resolution. The output of the program is a dataset consistent with the specified landmask. The program allows the users to specify an undefined value. If none is specified, -9999.0 will be used.

CALLING SEQUENCE:

```
Usage: \\
avgdata_from_1km to-resolution(km) input_file output_file mask_file
Usage example: \\
avgdata_from_1km 9 sand_1KM.1gd4r sand_9KM.1gd4r input_mask_9KM.1gd4r [undef_value]
```

REMARKS:

```
This program works only generating for GLOBAL datasets. \\
This program can be used to generate coarse-resolution data for the
following datasets:
 1. soil fraction data (sand,silt,clay fractions) \\
 2. albedo data \\
 3. greenness fraction data \\
 4. LAI data \\
 5. SAI data \\
 6. Bottom temperature data \\
 7. Topography data \\
```

REVISION HISTORY:

```
Jun 2005 : Yudong Tian, Initial Specification
Jul 2006 : Sujay Kumar, Packaged for public release.
```

2.0.3 domdata_from_1km (Source File: domdata_from_1km.F90)

This program uses 1km (1/100 deg) data to generate data at coarser resolutions for use in the LIS code, by selecting dominant values from the distribution within a gridcell. Both input and output data are assumed to be in big_endian, direct access formats and gridded and of floating point type. This program requires the 1km dataset to be aggregated, and the landmask at the coarser resolution. The output of the program is a dataset consistent with the specified landmask. The program allows the users to specify an undefined value. If none is specified, -9999.0 will be used.

CALLING SEQUENCE:

```
Usage: \\
domdata_from_1km to-resolution(km) input_file output_file mask_file
Usage example: \\
domdata_from_1km 9 tex_1KM.1gd4r tex_9KM.1gd4r input_mask_9KM.1gd4r [undef_value]
```

REMARKS:

```
This program works only generating for GLOBAL datasets. \\

The user needs to specify the number of classification
categories in the program (by changing nt) \\
This program can be used to generate coarse-resolution data for the
following datasets:
 1. soil texture data \\
 2. soil color data\\
```

REVISION HISTORY:

```
Jun 2005 : Yudong Tian, Initial Specification
Jul 2006 : Sujay Kumar, Packaged for public release.
```

2.0.4 avgdata_from_1km_STATSGO (Source File: avgdata_from_1km_STATSGO.F90)

This program uses 1km (1/100 deg) data to generate data at coarser resolutions for use in the LIS code, by performing and aggregated average of the valid grid points. This is a customized program to work for the CONUS domain defined by the STATSGO soil data. Both input and output data are assumed to be in big_endian, direct access formats and gridded and of floating point type. This program requires the 1km dataset to be aggregated, and the landmask at the coarser resolution. The output of the program is a dataset consistent with the specified landmask. The program allows the users to specify an undefined value. If none is specified, -9999.0 will be used.

CALLING SEQUENCE:

```
Usage: \\
avgdata_from_1km to-resolution(km) input_file output_file mask_file
Usage example: \\
avgdata_from_1km 9 sand_1KM.1gd4r sand_9KM.1gd4r input_mask_9KM.1gd4r [undef_value]
```

REMARKS:

```
This program works only generating datasets in the CONUS
domain defined by STATSGO. \\
This program can be used to generate coarse-resolution data for the
following datasets:
 1. soil fraction data (sand,silt,clay fractions) \\
```

REVISION HISTORY:

```
Jun 2005 : Yudong Tian, Initial Specification
Jul 2006 : Sujay Kumar, Packaged for public release.
```

2.0.5 domdata_from_1km_STATSGO (Source File: domdata_from_1km_STATSGO.F90)

This program uses 1km (1/100 deg) data to generate data at coarser resolutions for use in the LIS code, by selecting dominant values from the distribution within a gridcell. This is a customized program to work for the CONUS domain defined by the STATSGO soil data. Both input and output data are assumed to be in big_endian, direct access formats and gridded and of floating point type. This program requires the 1km dataset to be aggregated, and the landmask at the coarser resolution. The output of the program is a dataset consistent with the specified landmask. The program allows the users to specify an undefined value. If none is specified, -9999.0 will be used.

CALLING SEQUENCE:

```
Usage: \\
domdata_from_1km_STATSGO to-resolution(km) input_file output_file mask_file
Usage example: \\
domdata_from_1km_STATSGO 9 tex_1KM.1gd4r tex_9KM.1gd4r input_mask_9KM.1gd4r [undef_value]
```

REMARKS:

```
This program works only generating datasets in the CONUS
domain defined by STATSGO. \\

The user needs to specify the number of classification
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